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PATENT APPLICATION

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IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Yifeng Wu et al.

Confirmation No.: 8319

Application No.: 10/825,452

Examiner: RILEY, Marcus T

Filing Date: April 15, 2004

Group Art Unit: 2625

Title: Image Processing System and Method

Mail Stop Appeal Brief-Patents
Commissioner For Patents
PO Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on July 2, 2009.

☒ The fee for filing this Appeal Brief is $540.00 (37 CFR 41.20).

☐ No Additional Fee Required.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d)) for the total number of months checked below:

☐ 1st Month $130	☐ 2nd Month $490	☐ 3rd Month $1110	☐ 4th Month $1730

☐ The extension fee has already been filed in this application.

☒ (b) Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account 08-2025 the sum of $ 540. At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account 08-2025 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 08-2025 under 37 CFR 1.16 through 1.21 inclusive, and any other sections in Title 37 of the Code of Federal Regulations that may regulate fees.

Respectfully submitted,

Yifeng Wu et al.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Patent Application of:	Group Art Unit: 2625
Yifeng Wu et al.	Examiner: Riley, Marcus T.
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For: Image Processing System and Method	

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an Appeal Brief under Rule 41.37 appealing the decision of the Primary Examiner dated May 5, 2009 (the "final Office Action" or "Action"). Each of the topics required by Rule 41.37 is presented herewith and is labeled appropriately.

I. Real Party in Interest

The real party in interest is Hewlett-Packard Development Company, LP, a limited partnership established under the laws of the State of Texas and having a principal place of business at 20555 S.H. 249 Houston, TX 77070, U.S.A. (hereinafter "HPDC"). HPDC is a Texas limited partnership and is a wholly-owned affiliate of Hewlett-Packard Company, a Delaware Corporation, headquartered in Palo Alto, CA. The general or managing partner of HPDC is HPQ Holdings, LLC.

II. Related Appeals and Interferences

There are no appeals or interferences related to the present application of which the Appellant is aware.

III. Status of Claims

Claims 1-39 are pending in the application and stand finally rejected. Accordingly, Appellant appeals from the final rejection of claims 1-39, which claims are presented in the Appendix.

IV. Status of Amendments

No amendments have been filed subsequent to the final Office Action of May 5, 2009, from which Appellant takes this appeal.

V. Summary of Claimed Subject Matter

The system includes a plurality of printing units, an image source, and a system processing unit. The image source provides a print job comprising a plurality of images to the system processing unit. The system processing unit receives the plurality of images in the print job from the image source, and calculates an image histogram for each image in the print job. The system processing unit then determines the similarity of the images in the print job by comparing the calculated histograms. The system processing unit then classifies the images into classes based on the comparison, and sends each class to a particular printer. By sending each class to a particular printer, similar images are printed on the same printer. This reduces undesirable print variations when printing similar images. (Appellant's specification, p. 1, line 30 – p. 2, line 8).

Appellant's independent claims recite the following subject matter.

Claim 1 recites:

A printing control system , comprising:

a plurality of printing units (12, 14, 16) (*Appellant's specification, p. 3, lines 1-23*);

an image source (20) providing a print job comprising a plurality of images (*Appellant's specification, p. 3, lines 16-32 – p. 4, lines 1-4*); and

a system processing unit (18), wherein the system processing unit (18) is configured to receive the plurality of images in the print job from the image source (20) (*Appellant's specification, p. 4, lines 5-12*), calculate an image histogram for each image in the print job (*Appellant's specification, p. 5, lines 11-19*), determine a similarity of the images in the print job by comparing the calculated histograms (*Appellant's specification, p. 7, lines 1-21*), classify the images into at least a first and a second class

based on the similarity of the histograms (120) (*Appellant's specification, p. 7, lines 22-27*), and send each of the images of the first class to a respective one of the printing units (120) (*Appellant's specification, p. 18, lines 4-10*).

Claim 19 recites:

A method of processing a print job including multiple images with a printing system including multiple printing units (12, 14, 16) (*Appellant's specification, p. 3, lines 1-23*), comprising:

identifying the number of printing units in the system, the system including at least a first printing unit (12) and a second printing unit (14) (*Appellant's specification, p. 3, lines 1-23*);

calculating a histogram for each image in the print job (*Appellant's specification, p. 9, lines 13-21*);

comparing the histograms of the images in the print job to determine similarity between the images (*Appellant's specification, p. 9, lines 12- 21*);

grouping the images into groups based on the similarity of the comparisons of the histograms (*Appellant's specification, p. 9, line 22 – p. 14, line 30*);

sorting the images in the groups into classes, including at least a first class and a second class (*Appellant's specification, p. 14, line 30 – p. 16, line 16*); and

sending the images to the printing units for printing, including sending the images from the first class to the first printing unit and sending the images from the second class to the second printing unit (*Appellant's specification, p. 16, line 17-29*).

Claim 29 recites:

A printing control system, comprising:

a plurality of printing units (12, 14, 16) (*Appellant's specification, p. 3, lines 1-23*);

an image source (20) providing a print job comprising a plurality of images (*Appellant's specification, p. 3, lines 16-32 – p. 4, lines 1-4*); and

processing means (18) for receiving the plurality of images in the print job from the image source (20) (*Appellant's specification, p. 4, lines 5-12*), for calculating an image histogram for each image in the print job (*Appellant's specification, p. 5, lines 11-19*), for comparing the calculated histograms and determining a similarity of the images in the print job (*Appellant's specification, p. 7, lines 1-21*), for classifying the images into classes based on the similarity of the comparison (*Appellant's specification, p. 7, lines 22-27*), and for sending each of the images in a class to a respective one of the printing units (*Appellant's specification, p. 18, lines 4-10*).

VI. Grounds of Rejection to be Reviewed on Appeal

The final Office Action raised the following grounds of rejection.

(1) Claims 1, 3, 13, 16-18, 19, 29, and 31 were rejected under 35 U.S.C. § 103(a) as unpatentable over the combined teachings of U.S. Patent No. 7,301,677 to Oyumi ("Oyumi") and U.S. Patent No. 6,671,402 to Pass et al. ("Pass").

(2) Claims 2, 14, 15, 20, 28, 30, and 39 were rejected under 35 U.S.C. § 103(a) as being unpatentable over combination of Oyumi, Pass, and U.S. Patent No. 7,304,761 to Enomoto ("Enomoto").

(3) Claims 4-8, 12, 21-23, 27, 32-34 and 38 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Oyumi, Pass, and U.S. Patent No. 7,110,591 to Neubauer et al. ("Neubauer").

(4) Claims 9-11, 24-26, and 35-37 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Oyumi, Pass, Neubauer, and U.S. Patent No. 6,714,677 to Sterns ("Sterns").

According, Appellant hereby requests review of each of these grounds of rejection in the present appeal.

VII. Argument

As a preliminary matter, the Appellant notes that, in many instances, the Office Action's treatment of a claim consists only of a quotation from that claim paired with a direct quotation from the cited prior art reference. (*see* Office Action rejections for claims 5-8, 10-12, 14, 15, 22, 23, 25-28, 33, 34, 36-39). While this provides an indication of where the Examiner feels that the prior art teaches or suggests elements of Appellant's claims, in many instances, the quotation from the prior art does not appear to Appellant to be at all relevant to the claim element cited. It is therefore, extremely problematic that these rejections fail to provide any explanation as to how or why the quotation from the cited reference is relevant to the Appellant's claims. "It is important for an examiner to properly communicate the basis for a rejection so that the issues can be identified early and the applicant can be given fair opportunity to reply." (MPEP 706.02(j)).

Additionally, where the Examiner makes 35 U.S.C. § 103 rejection but does not actually explain how or why the claim limitations are taught or suggested in the cited prior art, the Examiner has failed to make a *prima facie* case obviousness. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). It is insufficient for the Examiner to merely provide a quotation from a claim paired with a direct quotation from the cited prior art reference if the quotation from the cited prior art is not immediately relevant to the corresponding claim element. Consequently, in the final Office Action, the Examiner has failed to make a *prima facie* case of obviousness for at least claims 5-8, 10-12, 14, 15, 22, 23, 25-28, 33, 34, and 36-39. The Examiner's admonition that it is the Appellant's responsibility to "fully consider the reference(s) in (their) entirety as potentially teaching all or part of the

claimed invention" (Action, p. 29) does not relieve the Examiner from the requirement to make a *prima facie* case of obviousness for each claim in the first instance by clearly indication where ***and*** how the prior art references teach or suggest every claim limitation.

Nevertheless, Appellant has sought to understand the grounds for rejection each claim to the extent allowed by the final Office Action. Thus, despite lacking a thorough explanation of the basis behind the rejection of any given claim, Appellant will now demonstrate, to the extent possible, that none of the cited references, separately or in combination, teach or suggest the claimed subject matter, e.g., selecting a group of images based on similarities between the image content and sending the group of images to one of plurality of printers within a printing system.

(1) Claims 1, 3, 13, 16-18, 19, 29, and 31 are patentable over Oyumi and Pass:

Claim 1:

Claim 1 recites:

> A printing control system, comprising:
> a plurality of printing units;
> an image source providing a print job comprising a plurality of images; and
> a system processing unit, wherein the system processing unit is configured to receive the plurality of images in the print job from the image source, calculate an image histogram for each image in the print job, determine a similarity of the images in the print job by comparing the calculated histograms, classify the images into at least a first and a second class based on the similarity of the histograms, and send each of the images of the first class to a respective one of the printing units.

The combination of Oyumi and Pass does not teach or suggest, the recited printing control system which comprises a system processing unit configured to "calculate an image histogram for each image," in a plurality of images in a print job and

"classify the images into a first and second class based on the similarity of the histograms, and send each of the images of the first class to a respective one of the printing units."

Oyumi teaches placing alignment marks on the borders of printed page, then using the alignment marks to print or realign the page for printing. (Oyumi, col. 8, lines 40-50). The Action apparently asserts that the calibration and scanning of these alignment marks as taught by Oyumi teaches the recited calculation of "an image histogram for each image," in "a plurality of images in a print job." This is incorrect. Oyumi does not teach or suggest the calculation of any histogram of any image which is to be printed. In contrast, Oyumi teaches locating existing alignment marks on a previously printed page by scanning the alignment marks and using a histogram to precisely locate the alignment marks. (Oyumi, col. 9 line 32-col. 10, line 49). These alignment marks cannot be reasonably interpreted as "a plurality of images in a print job" which are sent to a "printing unit" because they are already printed on the substrate. For the same reason, Oyumi cannot teach or suggest sending "each of the images of the first class to a respective one of the printing units" because the alignment marks already exist on the page.

Further, Oyumi does not teach or suggest calculating an "image histogram for *each image*" in a "plurality of images in the print job." Specifically, Oyumi does not teach or suggest calculating an image histogram of the primary image. In contrast, Oyumi teaches "enlarging or shrinking" the primary image according to the position of the alignment marks (Oyumi, col. 6, lines 40-43).

Oyumi does not teach or suggest sending "each of the images of the first class to a respective one of the printing units." In contrast, the quoted portions of Oyumi teach

that "enlarg(ing) an image" then "distributing the enlarged image data to the respective printers." (Oyumi, col. 6, lines 40-43). Clearly this portion of Oyumi teaches distribution of a single image to multiple printers.

The Office Action concedes that Oyumi does not teach or suggest "determining a similarity of the images in the print job by comparing the calculated histograms; classifying the images into at least a first and a second class based on the similarity of the histograms." (Action, p. 5). Consequently, the Action cites Pass. However, Pass does not remedy the shortcomings of Oyumi. Specifically, Pass does not teach or suggest determining a similarity of the images in the print job by comparing the calculated histogram. Rather, Pass teaches searching for images contained in a database using information extracted from the images (Pass, col. 1, lines 14-31; col. 8, line 30 – col. 11, line 27). No where does Pass teach or suggest anything related to "determining the ***similarity of images in a print job***." Pass is absolutely silent with respect printing, print jobs, images which make up print jobs, or determining similarity of images in a print job.

Applicant notes that the Action states it would have been obvious for "one of ordinary skill in the art to modify the printer system as taught by Pass '402." (Action, p. 6). This is clearly a typographical error. As discussed above, Pass does not teach or suggest any type of printing system.

Under the analysis required by *Graham v. John Deere*, 383 U.S. 1 (1966) to support a rejection under § 103, the scope and content of the prior art must first be determined, followed by an assessment of the differences between the prior art and the claim at issue in view of the ordinary skill in the art. In the present case, the scope and content of the prior art, as evidenced by Oyumi and Pass, did not include the subject

matter of claim 1, particularly "calculate an image histogram for each image," in a print job and "classify the images into a first and second class based on the similarity of the histograms, and send each of the images of the first class to a respective one of the printing units."

The differences between the cited prior art and the claimed subject matter are significant because the claimed subject matter provides features and advantages with regard to minimizing objectionable deviations between the printed versions of similar images in a print job by sending a class of similar images to one printing unit. (*See* Appellant's specification, p. 4, line 5 – page 5, line 4). Consequently, the cited prior art will not support a rejection of claim 1 and its dependent claims under 35 U.S.C. § 103 and *Graham*.

Claim 19:

Claim 19 recites:

> A method of processing a print job including multiple images with a printing system including multiple printing units, comprising:
> identifying the number of printing units in the system, the system including at least a first printing unit and a second printing unit;
> calculating a histogram for each image in the print job;
> comparing the histograms of the images in the print job to determine similarity between the images;
> grouping the images into groups based on the similarity of the comparisons of the histograms;
> sorting the images in the groups into classes, including at least a first class and a second class; and
> sending the images to the printing units for printing, including sending the images from the first class to the first printing unit and sending the images from the second class to the second printing unit.

Oyumi and Pass do not teach or suggest, separately or in combination, subject matter of claim 19. First, Oyumi and Pass do not teach or suggest "calculating a histogram for each image in the print job." As discussed above, the alignment marks

taught by Oyumi already exist on the page and are not part of a "print job." Further, Oyumi does not teach or suggest calculating a histogram "each image in the print job." In contrast, the principle image which Oyumi distributes to a plurality of printers is resized (Oyumi, col. 6, lines 40-43). No where does Oyumi teach or suggest that a histogram of this principle image is calculated. Consequently, Oyumi does not teach or suggest "calculating a histogram" for "each image in a print job." Pass does not remedy the shortcomings of Oyumi. Pass does not teach or suggest any type of "print job" or "calculating a histogram of each image in the print job."

Second, the Action concedes that Oyumi does not teach "comparing histograms of the images in a print job to determine similarity between the images" (Action, p. 9). Pass fails to remedy the shortcomings of Oyumi for a number of reasons. As discussed above, no where in the combined references is "calculating of a histogram for each image in a print job" taught or suggested. Consequently, the references cannot teach "comparing the histograms of the images in the print job to determine similarity between the images." Further, no where does Pass fails to teach or suggest any type of comparison of "images in the print job."

Third, the Action concedes that Oyumi does not teach or suggest "grouping the images into groups based on the similarity of the comparisons of the histograms" and "sorting the images into the groups into class, including at least a first class and a second class." (Action, p. 9). Pass fails to remedy the shortcomings of Oyumi. The Action asserts that Pass at col. 1, lines 45-52 teaches this subject matter. (Action, p. 9). The cited portion of Pass is reproduced in its entirety below:

> Representing an image may further include calculating a posterized joint histogram. For example, the posterized joint histogram may be calculated after the weighting factor has been applied. Information reflecting more than one feature of the image may be extracted from the image. Extracted features may

include color, edge density, texturedness, gradient magnitude, and rank." (Pass, col. 1, lines 45-52)

This section of Pass does not appear to be remotely related to the recited subject matter of claim 19. No where is there a teaching or suggestion of "a grouping of images," "comparison of histograms," "sorting of images," or "a first and second class." In addition to failing to teach the elements within the claim, Pass fails to teach or suggest the recited relationships between the elements. For example, Pass fails to teach or suggest "grouping the images" based on "the similarity of the comparisons of the histograms." Further, Pass fails to teach or suggest "sorting the images into the groups into class, including at least a first class and a second class."

Fourth, the combination of Oyumi and Pass does not teach or suggest "sending the images to the printing units for printing, including sending the images from the first class to the first printing unit and sending the images from the second class to the second printing unit." The Appellant notes that Examiner has incorrectly cited portions of Oyumi in the Action at the bottom of page 8 and the top of page 9. Two different quotations from Oyumi are given, but both of the quotations are cited as coming from Oyumi at column 6, lines 40-43. For purposes of responding to the Examiner's statements, Appellant will address the both the quotations from Oyumi included in the Action and the subject matter from column 6, lines 40-43.

Oyumi does not teach or suggest "sending the images from the first class to the first printing unit and sending the images from the second class to the second unit." No where does Oyumi teach a "first class," a "second class," or the separation of images into classes. Further, Oyumi does not teach or suggest sending any type of "class" to a printing unit. In contrast, the quoted portions of Oyumi teach that "enlarg(ing) an image" then "distributing the enlarged image data to the respective printers." (Oyumi,

col. 12, lines 48-54). Clearly this portion of Oyumi teaches distribution of a single image to multiple printers. A single image cannot be reasonably understood to be "images in a first class" and "images in a second class." The distribution of this image by Oyumi to "respective printers" (Oyumi, col. 12, lines 48-54) cannot be reasonably understood teach or suggest the recited "sending a first class of images to a first printing unit" and sending a second class of images to a second printing unit."

The Action also quotes a different portion of Oyumi which states "the host server….distributes images to the printers…" In this quotation, Oyumi appears to teach that there are multiple images, but does not teach that the images are separated into a first class and a second class or that the images are directed to a specific printer. As discussed above, no where does Oyumi teach "sending the images from the first class to the first printing unit and sending the images from the second class to the second printing unit" as recited in claim 19. As also discussed above, Pass fails to remedy the shortcomings of Oyumi because Pass does not teach or suggest the recite subject matter.

Under the analysis required by *Graham v. John Deere*, 383 U.S. 1 (1966) to support a rejection under § 103, the scope and content of the prior art must first be determined, followed by an assessment of the differences between the prior art and the claim at issue in view of the ordinary skill in the art. In the present case, the scope and content of the prior art, as evidenced by Oyumi and Pass, did not include the subject matter of claim 19, particularly "calculating a histogram for each image in the print job," "comparing the histograms of the images in the print job to determine similarity between the images," "grouping the images into groups based on the similarity of the comparisons of the histograms," "sorting the images in the groups into classes, including at least a first class and a second class" or "sending the images to the printing units for

printing, including sending the images from the first class to the first printing unit and sending the images from the second class to the second printing unit."

The differences between the cited prior art and the claimed subject matter are significant because the claimed subject matter provides features and advantages with regard to minimizing objectionable deviations between the printed versions of similar images in a print job by sending a class of similar images to one printing unit. (*See* Appellant's specification, p. 4, line 5 – page 5, line 4). Consequently, the cited prior art will not support a rejection of claim 19 and its dependent claims under 35 U.S.C. § 103 and *Graham*.

Claim 29

Claim 29 recites:

> A printing control system, comprising:
> a plurality of printing units;
> an image source providing a print job comprising a plurality of images; and
> processing means for receiving the plurality of images in the print job from the image source, for calculating an image histogram for each image in the print job, for comparing the calculated histograms and determining a similarity of the images in the print job, for classifying the images into classes based on the similarity of the comparison, and for sending each of the images in a class to a respective one of the printing units.

As discussed above with respect to claims 1 and 19, the combination of Oyumi and Pass does not teach or suggest "calculating histograms for each image in the print job, "comparing the calculated histograms and determining a similarity of the images in the print job" or for "classifying the images into classes based on the similarity of the comparison, and for sending each of the images in a class to a respective one of the printing units."

Specifically, the combination of Oyumi and Pass does not teach or suggest the calculation of histograms of any image included in a print job. Consequently, the combined references cannot compare histograms or determine a similarity the images in the print job. Additionally, no where do the Oyumi and Pass teach or suggest "classification of images into classes" or sending each of the images in a class to a respective one of the printing units. In contrast, Oyumi is specifically directed toward changing the size of an image so that an image can be printed on any suitable printer. Oyumi teaches that the "image data" derived from a single image is "distributed....to the respective printers." (Oyumi, col. 12, lines 43-54). Clearly Oyumi is not sending multiple "images which are in a first class" to a dedicated printer. Pass fails to remedy this particular shortcoming of Oyumi because Pass does not teach or suggest any type of printing, print job, or printer.

Under the analysis required by *Graham v. John Deere*, 383 U.S. 1 (1966) to support a rejection under § 103, the scope and content of the prior art must first be determined, followed by an assessment of the differences between the prior art and the claim at issue in view of the ordinary skill in the art. In the present case, the scope and content of the prior art, as evidenced by, Oyumi and Pass clearly did not include the subject matter of claim 29. Consequently, the cited prior art will not support a rejection of claim 29 and its dependent claims under 35 U.S.C. § 103 and *Graham*.

Additionally, various dependent claims of the application recite subject matter that is further patentable over the cited prior art. Specific, non-exclusive examples follow.

Claims 3, 13, and 31:

Claim 3 recites:

> The system of claim 2, wherein the plurality of printing units includes at least a first printing unit and a second printing unit, wherein the number of classes equals the number of printing units and includes at least the first class and the second class, and wherein the first class of images is printed on the first printing unit and the second class of images is printed on the second printing unit.

Similarly, claims 13 and 31 recite "wherein the number of core classes is equal to the number of printing units in the system" and "wherein the number of classes equals the number of printing units," respectively. This rejection should not be sustained for at least the same reasons given above in favor of the patentability of the independent claims.

The Action argues in each instance that Oyumi teaches the recited "wherein the number of classes equals the number of printing units" and "wherein the first class of images is printed on the first print unit and the second class of images is printed on the second print unit." However, the Action does not point out how or where Oyumi teaches the recited subject matter. No where in the cited portions of Oyumi is there any teaching or suggestion that "the number of classes equals the printing units." In contrast, in the cited portions of Oyumi appears to be gathering information from various printers so the various printers produce similarly sized copies of an image. (Oyumi, col. 12, lines 21-26). Clearly the calibration data for each printer cannot be reasonably understood as the recited "first class of images." The calibration data are numeric values which represent reduction ratios used to resize an image so that the image can be repeatedly printed on any of a number of printers (Oyumi, col. 4, line 64 – col. 5 line 7; col. 12, lines 24-26).

Consequently, the cited prior art will not support a rejection of claims 3, 13, and 31 under 35 U.S.C. § 103 and *Graham*.

(2) Claims 2, 14, 15, 20, 28, 30, and 39 are patentable over Oyumi, Pass, and Enomoto.

The rejection of claims 2, 14, 15, 20, 28, 30, and 39 should be not be upheld for at least the same reasons given above in favor of the patentability of independent claims 1, 19, and 31. Additionally, the Examiner explicitly or implicitly concedes that Oyumi and Pass do not teach or suggest the subject matter of claims 2, 14, 15, 20, 28, 30, and 39. (Action, p. 10-15). Consequently, the Examiner cites Enomoto.

However, Enomoto fails to remedy the shortcomings of Oyumi and Pass. Enomoto is directed toward improving appearance of reprinted photos by identifying a photo, identifying print settings used in the original printing of the photo, and retrieving the print settings to reprint the photo (Enomoto, col. 3, line 19 – col. 4, line 15). No where does Enomoto, either separately or in combination with Oyumi and Pass, teach or suggest selecting a group of images based on similarities between the image content and sending the group of images to one of plurality of printers within a printing system.

The Action rejects each of claims 2, 14, 15, 20, 28, 30, and 39 with reference to a single quotation from Enomoto. (Action, pages 10-15). This quotation from Enomoto is reproduced below in its entirety:

> "More specifically, in the printing with film processing, from the prescan data, the setup subsection 70 produces a density histogram, calculates an image characteristic quantity such as a predetermined percentage point of frequency of a density histogram for a mean density, a highlight (minimum density) or a shadow (maximum density), LATD (Large Area Transmission Density), a maximum value density and a minimum value density of the histogram or the like so as to set the reading conditions for fine scan. " (Enomoto, col. 10, line 63 – col. 11, line 5).

Enomoto does not teach or suggest, in the quotation above or elsewhere, the recited subject matter of claims 2, 14, 15, 20, 28, 30, and 39. Specifically, claims 2, 20, and 30 are directed toward comparing histograms of images in the print job by calculating cross-correlation values based on the histograms. No where does Enomoto teach or suggest the comparison of histograms of images in a print job by calculating cross-correlation values base on the histograms. In contrast, Enomoto teaches using a histogram to during a prescan operation to determine the appropriate setting for the fine scan of a photo negative. (Enomoto, col. 10, line 65 – col. 11, line 5).

Claims 14, 28, and 39 are directed toward forming "classes from the core classes by adding any remaining image members of the sets to the core classes with which the sets are most similar." The quoted portion of Enomoto (above) has nothing to do with the recited subject matter of claims 14, 28, and 39. In contrast, the quoted portion of Enomoto merely states that a "density histogram" may be based on a number image characteristics including "a mean density, a highlight (minimum density) or a shadow (maximum density), LATD (Large Area Transmission Density), a maximum value density and a minimum value density." No where in Enomoto is there any discussion or suggestion of "forming classes," "core classes" or "adding any remaining image members of the sets to the core classes with which the sets are most similar."

Claim 15 recites "wherein the system processing unit is adapted to determine which sets are most similar to which of the core classes by a progressive process wherein the number of image members in a core class increases each time a set is merged into one of the core classes." Again, quoted portion of Enomoto has nothing to do with the recited subject matter of claims 15. Further, no where does Enomoto teach or suggest "sets" of images, "core classes," "progressive process," or increasing the

"number of image members in a core class" each time "a set is merged into one of the core classes."

Under the analysis required by *Graham v. John Deere*, 383 U.S. 1 (1966) to support a rejection under § 103, the scope and content of the prior art must first be determined, followed by an assessment of the differences between the prior art and the claim at issue in view of the ordinary skill in the art. In the present case, as amply demonstrated above, the scope and content of the prior art, as evidenced by Oyumi, Pass, and Enomoto, did not include the subject matter of Applicant's claims. Consequently, the cited prior art will not support a rejection of claims 2, 14, 15, 20, 28, 30, and 39 under 35 U.S.C. § 103 and *Graham*.

(3) Claims 4-8, 12, 21-23, 27, 32-34 and 38 are patentable over Oyumi, Pass, and Neubauer:

This rejection should not be sustained for at least the same reasons given above in favor of the patentability of the independent claims.

Claim 4:

Claim 4 recites:

> The system of claim 2, wherein the cross-correlation values between the images in the print job are normalized and have a value of one of 0, 1, and between 0 and 1, wherein the value is 0 when the images are most dissimilar and is 1 when the images are most similar.

The Action concedes that Oyumi and Pass do not teach or suggest the subject matter of claim 4. Consequently, the Action cites Neubauer. However, Neubauer does not remedy the shortcomings of Oyumi and Pass. The Action cites Neubauer at col. 6,

lines 15-29 as teaching the subject matter of claim 4. However, neither this portion nor any other part of Neubauer teaches or suggests the subject matter of claim 4. First, Neubauer has nothing to do with images in a print job. In contrast, Neubauer is directed toward recognizing markers which have already been formed on circuit boards (Neubauer, col. 1, line 54 – col. 2, line 54). Clearly markers which have already been formed on a circuit board are not images in a print job as recited in claim 4.

Second, the cited portion of Neubauer teaches way from "wherein the value is 0 when images are most dissimilar and is 1 when images are most similar." In contrast, Neubauer teaches that most dissimilar images would have a cross correlation value -1. (Neubauer, col. 6, lines 15-29). Clearly Neubauer does not teach or suggest that normalization of cross-correlation values between images in the print job are normalized and have a value of 0 "when the images are most dissimilar." Consequently, the cited prior art will not support a rejection of claim 4 under 35 U.S.C. § 103.

Claim 5:

Claim 5 recites:

> The system of claim 2, wherein the histogram for each image includes a multitude of bins each representing colors, and wherein calculating the cross-correlation values includes calculating a normalized summation of the product of each color bin for the multitude of bins.

The Action cites Neubauer at col. 6, lines 15-29 as teaching the subject matter of claim 5. The cited portion of Neubauer is reproduced in its entirety below:

> "Next, for each template image, a normalized correlation is computed with respect to the target image (step 67). In particular, a normalized correlation is computed with respect to brightness and contrast as follows: p=I I(i) * T(i), where p denotes the correlation coefficient, I denotes the target image, T denotes the template, and where p ε{-I,I} (where 1 indicates perfect correlation and -1 indicates anti –correlation)."
> (Neubauer column 6, lines 15-29).

Clearly absent from the cited portion of Neubauer is any teaching or suggestion of "a multitude of bins each representing colors" or "calculating the cross-correlation values includes calculating a normalized summation of the product of each color bin for the multitude of bins" as recited in claim 5. In contrast, Neubauer teaches "a normalized correlation is computed with respect to brightness and contrast." The "brightness and contrast" taught by Neubauer cannot be reasonably interpreted as the recited "a multitude of bins each representing colors." The "brightness and contrast" taught by Neubauer does not teach or suggest any hue, color, or a multitude of bins. In contrast, Neubauer teaches that the "brightness and contrast" relates to "gray value" image. (Neubauer, col. 7, lines 23-34).

Further, Neubauer's teaching that a "normalized correlation is computed with respect to brightness and contrast" does not teach or suggest "calculating the cross-correlation values includes calculating a normalized summation of the product of each color bin for the multitude of bins" as recited in claim 5. Consequently, the cited prior art will not support a rejection of claim 5 under 35 U.S.C. § 103.

The rejections of claims 21 and 32 are substantially similar to the rejection of claim 5. Claims 21 and 32 are patentable for at least the reasons given above for the patentability of claim 5.

Claim 6:

Claim 6 recites:

> The system of claim 2, wherein the system processing unit is adapted to classify the images based on the comparison of the calculated histograms by forming a group for each of the images in the print job, and then adding other

> images to the group as image members of the group when the cross-correlation value between respective images is greater than a threshold value.

No where do the cited references teach or suggest classifying images "in a print job," classifying images a group based on "calculated histograms," classifying images "by forming a group for each of the images in the print job" or "adding other images to the group as image members of the group when the cross-correlation value between respective images is greater than a threshold value."

Neubauer fails to remedy the shortcomings of the other references. The Action cites a portion of Neubauer which teaches image recognition "templates which are retrieved from memory" and manually divided into a "class of templates" to use in the recognition process. (Neubauer, col. 5, lines 40-50). The computer system taught by Neubauer then compares a "target image" with each of the templates to find the template which most closely matches the target image. (Neubauer, col. 6, lines 30-42). This allows the computer system to recognize the target image.

Clearly the cited portion of Neubauer does not teach or suggest classifying images "in a print job," classifying images based on "calculated histograms," or classifying images "by forming a group for each of the images in the print job." First, the templates taught by Neubauer are not "images in a print job." In contrast, the templates are electronic recognition templates which Neubauer does not teach or suggest are printed. (Neubauer, col. 5, lines 40-50). Second, the templates taught by Neubauer are not classified based on "calculated histograms" as recited in claim 6. In contrast, Neubauer teaches that templates are manually divided by a user without any reference to histograms (Neubauer, col. 5, lines 18-29). Third, no where does Neubauer teach classifying images by forming a group for *each of the images in the print job*. In contrast, Neubauer teaches the division of templates into two groups: "good" and "bad"

(Neubauer, col. 6, lines 29-42). Clearly the division of template into "good" and "bad" groups is not the claimed "forming a group for *each of the images* in a print job." Fourth, Neubauer does not teach or suggest "adding other images to the group as image members of the group when the cross-correlation value between respective images is greater than a threshold value." In contrast, Neubauer teaches that images are recognized by determining which one of the templates best matches the target image. (Neubauer, col. 5, lines 18-29). Clearly matching a target image to a template does not teach or suggest "adding other images to the group as image members of the group."

Consequently, the cited prior art will not support a rejection of claim 6 under 35 U.S.C. § 103.

Claim 12:

Claim 12 recites:

> The system of claim 11, wherein the system processing unit is adapted to classify the images based on the comparison of the calculated histograms by also forming core classes from the sets by selecting the sets with the greatest number of image members as the core classes.

No where do the cited references teach or suggest a system processing unit which "is adapted to classify the images based on the comparison of the calculated histograms by also forming core classes from the sets by selecting the sets with the greatest number of image members as the core classes." Further, the cited portions of Neubauer fail to remedy the shortcomings of the other references. The Action cites a portion of Neubauer which teaches an image recognition process in which "the target image is compared to each of the templates in the selected template class and the recognition results are determined based on the template having a maximum correlation coefficient above a predetermined threshold. " (Neubauer, col. 5, lines 18-29). This portion of

Neubauer does not teach or suggest "core classes" or "core classes from the sets by selecting the sets with the greatest number of image members as the core classes." Consequently, the cited prior art will not support a rejection of claim 12 under 35 U.S.C. § 103.

The rejection of claim 27 is substantially similar to the rejection of claim 12. Claim 27 is patentable for at least the same reasons given above for the patentability of claim 12.

(4) Claims 9-11, 24-26, and 35-37 are patentable over Oyumi, Pass, Neubauer, and Sterns:

This rejection should not be sustained for at least the same reasons given above in favor of the patentability of the independent claims.

Claim 9:

Claim 9 recites:

> The system of claim 8, wherein the system processing unit is adapted to merge groups that have at least half of the image members in common into subgroups.

After conceding that Oyumi does not teach the subject matter of claim 9, the Examiner's rejection consists of a direct quotation from Sterns which is reproduced below in its entirety:

> Consistent with the principles of the present invention, a method of decoding a plurality of glyphs is provided comprising the steps of capturing an image of a group of glyphs to form image data for each glyph location; assigning for each location a first value indicative of the likelihood that location contains a glyph in a first state; assigning for each location a second value indicative of the likelihood that location contains a glyph in a second state; determining the difference between the first and second values for each potential glyph location; and decoding the plurality of glyphs based at least in part upon a distribution analysis of the determined differences. "
> (Sterns, col 1, line 66 – col. 2, lines 10)

The Examiner fails to show how or where the subject matter of claim 9 is taught in the above quotation from Sterns. For example, no where does the quotation teach or suggest the elements of claim 9, such as a "system processing unit," "merg(ing) groups" or "subgroups." Further, Sterns does not teach or suggest the recited relationships between the elements in claim 9. Specifically, Sterns does not teach or suggest "system processing unit is adapted to merge groups that have at least half of the image members in common into subgroups." Consequently, the cited prior art will not support a rejection of claim 9 under 35 U.S.C. § 103.

The rejections of claims 24 and 35 are substantially similar to the rejection of claim 9. Claims 24 and 35 are patentable for at least the reasons given above for the patentability of claim 9.

Claim 10:

Claim 10 recites:

> The system of claim 8, wherein the system processing unit is adapted to regroup image members from groups having less than half of the image members in common into subgroups by computing an average cross-correlation value of each image member of the groups with each group to determine the group to which the image member belongs.

The Examiner's rejection consists solely of a direct quotation from Sterns which is reproduced below in its entirety:

> More specifically, the step of assigning preferably includes performing cross-correlations for each location with first and second correlation kernels representing the first and second states of the glyphs. In this case the step of decoding preferably includes establishing a threshold value for the minimum determined difference indicative of unambiguous decoding of a glyph state. (Sterns, col. 2, lines 10-16).

The Examiner fails to show how or where the subject matter of claim 10 is taught in the above quotation. No where does the quotation teach or suggest the elements of claim 10. For example, no where in the quotation above is it taught or suggested that "an average cross correlation value of each image member of the groups" is calculated. In contrast Sterns teaches that the "cross-correlation *each location*" is performed (Sterns, col. 2, lines 10-16).

A *location* is not the claimed "image member." Performing the cross-correlation for a location as described by Sterns is not the recited "computing an average cross-correlation value for each image member." Consequently, the cited prior art will not support a rejection of claim 10 under 35 U.S.C. § 103.

The rejections of claim 25 and 36 are substantially similar to the rejection of claim 10. Claims 25 and 36 are patentable for at least the reasons given above for the patentability of claim 10.

Claim 11:

The Final Action fails to show how or why the quoted portion of Sterns (col. 1, line 66-col. 2, line 10) teaches or discloses the recited subject matter of claim 11. Specifically, Sterns does not teach or suggest "comparing histograms" to "classify images" or "forming sets from the subgroups by merging subgroups which have similar image members" as recited in claim 11. Consequently, the cited prior art will not support a rejection of claim 11 under 35 U.S.C. § 103.

The rejections of claims 26 and 37 are substantially similar to the rejection of claim 11. Claims 26 and 37 are patentable for at least the reasons given above for the patentability of claim 11.

In view of the foregoing, it is submitted that the final rejection of the pending claims is improper and should not be sustained. Therefore, a reversal of the Rejection of May 5, 2009 is respectfully requested.

Respectfully submitted,

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VIII. CLAIMS APPENDIX

1. (previously presented) A printing control system, comprising:

a plurality of printing units;

an image source providing a print job comprising a plurality of images; and

a system processing unit, wherein the system processing unit is configured to receive the plurality of images in the print job from the image source, calculate an image histogram for each image in the print job, determine a similarity of the images in the print job by comparing the calculated histograms, classify the images into at least a first and a second class based on the similarity of the histograms, and send each of the images of the first class to a respective one of the printing units.

2. (original) The system of claim 1, wherein the system processing unit is adapted to compare the calculated histograms by calculating cross-correlation values between the images in the print job based on the histograms.

3. (original) The system of claim 2, wherein the plurality of printing units includes at least a first printing unit and a second printing unit, wherein the number of classes equals the number of printing units and includes at least the first class and the second class, and wherein the first class of images is printed on the first printing unit and the second class of images is printed on the second printing unit.

4. (original) The system of claim 2, wherein the cross-correlation values between the images in the print job are normalized and have a value of one of 0, 1, and

between 0 and 1, wherein the value is 0 when the images are most dissimilar and is 1 when the images are most similar.

5. (original) The system of claim 2, wherein the histogram for each image includes a multitude of bins each representing colors, and wherein calculating the cross-correlation values includes calculating a normalized summation of the product of each color bin for the multitude of bins.

6. (original) The system of claim 2, wherein the system processing unit is adapted to classify the images based on the comparison of the calculated histograms by forming a group for each of the images in the print job, and then adding other images to the group as image members of the group when the cross-correlation value between respective images is greater than a threshold value.

7. (original) The system of claim 6, wherein the threshold value is between approximately 0.8 and approximately 0.95.

8. (original) The system of claim 6, wherein the system processing unit is adapted to classify the images based on the comparison of the calculated histograms by also forming subgroups from the groups by regrouping groups that have image members in common.

9. (original) The system of claim 8, wherein the system processing unit is adapted to merge groups that have at least half of the image members in common into subgroups.

10. (original) The system of claim 8, wherein the system processing unit is adapted to regroup image members from groups having less than half of the image members in common into subgroups by computing an average cross-correlation value of each image member of the groups with each group to determine the group to which the image member belongs.

11. (original) The system of claim 8, wherein the system processing unit is adapted to classify the images based on the comparison of the calculated histograms by also forming sets from the subgroups by merging subgroups that have similar image members.

12. (original) The system of claim 11, wherein the system processing unit is adapted to classify the images based on the comparison of the calculated histograms by also forming core classes from the sets by selecting the sets with the greatest number of image members as the core classes.

13. (original) The system of claim 12, wherein the number of core classes is equal to the number of printing units in the system.

14. (original) The system of claim 12, wherein the system processing unit is adapted to classify the images based on the comparison of the calculated histograms by also forming final classes from the core classes by adding any remaining image members of the sets to the core classes with which the sets are most similar.

15. (original) The system of claim 14, wherein the system processing unit is adapted to determine which sets are most similar to which of the core classes by a progressive process wherein the number of image members in a core class increases each time a set is merged into one of the core classes.

16. (original) The system of claim 1, wherein the printing units are each individual printers operatively coupled to the system processing unit.

17. (original) The system of claim 1, wherein the printing units are each print engines contained in a single printer.

18. (original) The system of claim 1, wherein the printing units are each printheads contained in a single printer.

19. (original) A method of processing a print job including multiple images with a printing system including multiple printing units, comprising:

identifying the number of printing units in the system, the system including at least a first printing unit and a second printing unit;

calculating a histogram for each image in the print job;

comparing the histograms of the images in the print job to determine similarity between the images;

grouping the images into groups based on the similarity of the comparisons of the histograms;

sorting the images in the groups into classes, including at least a first class and a second class; and

sending the images to the printing units for printing, including sending the images from the first class to the first printing unit and sending the images from the second class to the second printing unit.

20. (original) The method of claim 19, wherein comparing the histograms of the images includes calculating cross-correlation values between the images in the print job based on the histograms.

21. (original) The method of claim 20, wherein the histogram for each image includes a multitude of bins each representing colors, and wherein calculating the cross-correlation values includes calculating a normalized summation of the product of each color bin for the multitude of bins.

22. (original) The method of claim 20, wherein grouping the images into groups includes forming a group for each of the images in the print job, and then adding other images to the group as image members of the group when the cross-correlation value between respective images is greater than a threshold value.

23. (original) The method of claim 22, wherein sorting the images in the groups into classes includes forming subgroups from the groups by merging groups that have image members in common.

24. (original) The method of claim 23, wherein forming subgroups from the groups includes merging into respective subgroups groups that have at least half of the image members in common.

25. (original) The method of claim 23, wherein forming subgroups from the groups includes sorting into respective subgroups image members from groups that have less than half of the image members in common by computing an average cross-correlation value of each image member of the groups with each group to determine the group to which the image member belongs.

26. (original) The method of claim 23, wherein sorting the images in the groups into classes further includes forming sets from the subgroups by merging subgroups that have similar image members.

27. (original) The method of claim 26, wherein sorting the images in the groups into classes further includes forming core classes from the sets by selecting the sets with the greatest number of image members as the core classes.

28. (original) The method of claim 27, wherein sorting the images in the groups into classes further includes forming the classes from the core classes by adding

any remaining image members of the sets to the core classes with which the sets are most similar.

29. (previously presented) A printing control system, comprising:

a plurality of printing units;

an image source providing a print job comprising a plurality of images; and

processing means for receiving the plurality of images in the print job from the image source, for calculating an image histogram for each image in the print job, for comparing the calculated histograms and determining a similarity of the images in the print job, for classifying the images into classes based on the similarity of the comparison, and for sending each of the images in a class to a respective one of the printing units.

30. (original) The system of claim 29, wherein the processing means compares the calculated histograms by calculating cross-correlation values between the images in the print job based on the histograms.

31. (original) The system of claim 30, wherein the plurality of printing units includes at least a first printing unit and a second printing unit, wherein the number of classes equals the number of printing units and includes at least a first class and a second class, and wherein the first class of images is printed on the first printing unit and the second class of images is printed on the second printing unit.

32. (original) The system of claim 30, wherein the histogram for each image includes a multitude of bins each representing colors, and wherein calculating the cross-correlation values includes calculating a normalized summation of the product of each color bin for the multitude of bins.

33. (original) The system of claim 30, wherein the processing means classifies the images based on the comparison of the calculated histograms by forming a group for each of the images in the print job, and then adding other images to the group as image members of the group when the cross-correlation value between respective images is greater than a threshold value.

34. (original) The system of claim 33, wherein the processing means classifies the images based on the comparison of the calculated histograms by also forming subgroups from the groups by regrouping groups that have image members in common.

35. (original) The system of claim 34, wherein the processing means merges groups that have at least half of the image members in common into subgroups.

36. (original) The system of claim 34, wherein the processing means regroups image members from groups having less than half of the image members in common into subgroups by computing an average cross-correlation value of each image member of the groups with each group to determine the group to which the image member belongs.

37. (original) The system of claim 34, wherein the processing means classifies the images based on the comparison of the calculated histograms by also forming sets from the subgroups by merging subgroups that have similar image members.

38. (original) The system of claim 37, wherein the processing means classifies the images based on the comparison of the calculated histograms by also forming core classes from the sets by selecting the sets with the greatest number of image members as the core classes.

39. (original) The system of claim 38, wherein the processing means classifies the images based on the comparison of the calculated histograms by also forming final classes from the core classes by adding any remaining image members of the sets to the core classes with which the sets are most similar.

IX. Evidence Appendix

None

X. Related Proceedings Appendix

None